

WHAT IS CLAIMED IS:

1. A film comprising at least one layer of silica containing fluorine.

5           2. The film according to Claim 1, wherein a concentration of the fluorine in the layer or layers of silica is not less than 0.1 mol% nor more than 10 mol%.

10           3. The film according to Claim 2, wherein said concentration of the fluorine is not less than 1 mol%.

15           4. The film according to Claim 1, wherein a refractive index of the layer or layers of silica for  $F_2$  laser light is 1.60 to 1.80.

            5. The film according to Claim 1, comprising a layer a material of which is selected from the group consisting of  $MgF_2$ ,  $LiF$ , and  $Na_3AlF_6$ .

20           6. An optical element wherein the film as set forth in any one of Claims 1 to 5 is added on a surface thereof.

25           7. The optical element according to Claim 6, wherein said element is comprised of fluorite.

            8. The optical element according to Claim 5,

wherein said element is comprised of silica containing fluorine.

5        9. The optical element according to Claim 6,  
wherein said film is an antireflection coating.

10       10. An optical apparatus for vacuum ultraviolet  
lithography, comprising the optical element as set  
forth in Claim 6.

11. An optical apparatus for vacuum ultraviolet  
lithography, comprising the optical element as set  
forth in any one of Claims 7 to 9.

15       12. A device fabrication method comprising a step  
of exposing a wafer in a device pattern by the optical  
apparatus as set forth in Claim 10, and a step of  
developing the wafer thus exposed.

20       13. A device fabrication method comprising a step  
of exposing a wafer in a device pattern by the optical  
apparatus as set forth in Claim 11, and a step of  
developing the wafer thus exposed.